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EXAMINER

RALEIGH, DONALD L

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/580,204	Applicant(s) KAWAI, CHIHIRO	
	Examiner DONALD L. RALEIGH	Art Unit 2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/23/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claim 1 is objected to because of the following informalities:

Claim 1 recites, "located at the center in a radius direction." For the purpose of examination, the Examiner reads "located at the center of the fiber ~~in a radius direction~~."

Claim 1 recites, "an outermost surface." For the purpose of examination, the Examiner reads "an outermost surface of the fiber."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 14 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 14, the limitation, "the EL fiber according to claim 1 and a photocatalytic fiber are combined in alternate position," is not clear. For the purpose of examination, the Examiner reads, "the EL fiber of claim 1 having a photocatalytic reactor structure in which a photocatalytic layer is disposed upon".

Claim 19 is likewise rejected.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,3,5-6,13-14 and 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Duggal et al (US Patent No. 6,538,375).

Regarding Claim 1, Duggal discloses ,at least in Figures 3-7 and the abstract, line 1, the EL fiber having a function of emitting ultraviolet light or visible light with a wavelength of 400 nm or less (Column 4, lines 27-28 defines Figure 3 as a radiation emitting device and lines 31-32 defines radiation as including the "UV" range (which is 400 nm or less in wavelength) and characterized in that the cross-sectional structure of the fiber comprises an internal electrode (27) located at the center of the fiber (Figure 4 shows a central core at the center, but Column 4, lines 58-60 discloses that this core may be omitted, leaving the electrode (27) at the center) , an internal insulating layer (26) disposed around the internal electrode (27) , a light-emitting layer (23), an external electrode (28), and a protective layer (29) disposed on an outermost surface of the fiber (see Figure 4).

Applicant is respectfully reminded that while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber,

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128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997). The clause in claim 1, “and the light is emitted by application of an alternating current electric field between the electrodes,” does not structurally distinguish the apparatus from the prior art. See also MPEP §2114.

Regarding Claim 3, Duggal discloses , at least in Figures 3-7, the EL fiber having a function of emitting ultraviolet light or visible light with a wavelength of 550 nm or less (Column 7, lines 30-37 lists various phosphors that can be used in the device that emit at less than 550 nm), characterized in that the cross-sectional structure of the fiber comprises an internal electrode (27) located at the center in a radius direction (Column 4, lines 58-60), an internal insulating layer (26) disposed around the internal electrode (27) , a light-emitting layer (23), an external electrode (28) , a protective layer (29), and a particle layer or a thin film (29) disposed on an outermost surface (see Figure 4) and formed from a material having a photocatalytic function (TiO_2)(Column 7, lines 38-44) , and the light is emitted by application of an alternating current electric field)

Regarding Claim 5, Duggal discloses, at least in Figures 3-7, wherein the protective layer (29) itself is formed from a material having a photocatalytic function.(Column 7, lines 38-44, TiO_2 is photocatalytic).

Regarding Claim 6, Duggal discloses, in Column 7, lines 38-40, the EL fiber wherein the material having a photocatalytic function is TiO_2 .

Regarding Claim 13, Duggal discloses the EL fiber which comprises a photocatalytic reactor . Duggal discloses in column 7, lines 38-44, that the fiber may contain TiO_2 in its outermost layer . (which is a photocatalytic reactor).

Regarding Claims 14 and 19, Duggal discloses, at least in Figure 3, and the abstract, lines 1-2, the EL fiber having a photocatalytic reactor structure in which a photocatalytic layer is disposed upon. In Column 7, lines 38-40, Duggal discloses using a TiO_2 (photocatalytic) layer (reactor structure) in the device to scatter radiation. Also, column 7, lines 41-43, teaches that it may be the outermost layer (over the encapsulating material (29)).

Regarding Claim 18, Duggal discloses the EL fiber which comprises a photocatalytic reactor (column 7, lines 38-40 teaches using TiO_2 which is a photocatalytic reactor).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duggal in view of Hanano (Japanese Publication) No. JP 07-235376.

Regarding Claims 2 and 4, Duggal fails to exemplify the EL fiber wherein an external insulating layer (13)(Figure A) is disposed between the light-emitting layer (12) and the external electrode (14).

In the same field of endeavor, Hanano teaches the EL fiber wherein an external insulating layer (13)(Figure A) is disposed between the light-emitting layer (12) and the external electrode (14).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the insulating layer as taught by Hanano into the EL fiber of Duggal in order to provide electrical separation between the two electrodes.

Claims 7, 12, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duggal in view of Andriessen (US PG Pub. No. 2002/0153830).

Regarding Claim 7, Duggal fails to exemplify the EL fiber wherein the light emitting layer has a structure in which fluophor particles having a function of emitting visible light or ultraviolet light are dispersed in a matrix containing at least one type of a dielectric resin and a dielectric ceramic.

Andriessen teaches in Paragraph [0008] wherein the light emitting layer (lines 1-2 (active luminescent layer) has a structure in which fluorophor particles (ZnS, line 1)

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having a function of emitting visible light or ultraviolet light (Paragraph [0100], line 3 (490nm) are dispersed in a matrix containing at least one type of a dielectric resin (Paragraph [0009], line 5 (cyanoresin) and a dielectric ceramic (Paragraph [0008], line 9 (BaTiO_3) to prevent catastrophic breakdowns (Para. [0008], line 8) and to provide a high dielectric constant material for the resin (Para. [0009], lines 1-4)

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the dielectric ceramic and dielectric resin as taught by Andriessen into the EL layer of Duggal, to prevent catastrophic breakdowns and to provide a high dielectric constant material for the resin.

Regarding Claim 12, Duggal, fails to exemplify the EL fiber wherein the average particle diameter of the fluophor constituting the light-emitting layer is 10 nm or less.

Andriessen teaches in Paragraph [0074], lines 1-5 using a ZnS (fluorophor) with a particle size of 1.5 to 5nm in order to produce very thin films.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the small particle size as taught by Andriessen into the EL fiber of Duggal, in order to produce very thin films.

Regarding Claim 15, Duggal, fails to exemplify the EL fiber wherein the light-emitting layer has a structure in which fluophor particles having a function of emitting visible light or ultraviolet light are dispersed in a matrix containing at least one type of a dielectric resin and a dielectric ceramic.

Andriessen teaches ,in Paragraph [0008], wherein the light emitting layer (lines 1-2 (active luminescent layer)) has a structure in which fluorophor particles (ZnS, line 1) having a function of emitting visible light or ultraviolet light (Paragraph [0100], line 3 (490nm)) are dispersed in a matrix containing at least one type of a dielectric resin (Paragraph [0009], line 5 (cyanoresin) and a dielectric ceramic (Paragraph [0008], line 9 (BaTiO₃) to prevent catastrophic breakdowns (Para. [0008], line 8) and to provide a high dielectric constant material for the resin (Para. [0009], lines 1-4)

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the dielectric ceramic and dielectric resin as taught by Andriessen into the EL layer of Duggal, to prevent catastrophic breakdowns and to provide a high dielectric constant material for the resin.

Regarding Claim 17, Duggal, fails to exemplify the EL fiber wherein the average particle diameter of the fluophor constituting the light-emitting layer is 10 nm or less.

Andriessen teaches in Paragraph [0074], lines 1-5 using a ZnS (fluorophor) with a particle size of 1.5 to 5nm.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the small particle size as taught by Andriessen into the EL fiber of Duggal, in order to produce very thin films.

Claims 8,11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duggal in view of Noma et al (US Patent No. 5,670,839).

Regarding Claims 8 and 16, Duggal, fails to exemplify the EL fiber wherein the fluorophor constituting the light-emitting layer containing ZnS as a first primary component and, as second components, a first additional element constituting an acceptor level and a second additional element constituting a donor level in a semiconductor partly including or not including a group II-IV compound semiconductor.

Noma teaches (Column 1, line 38, ZnS:GdF₃) wherein the fluorophor (ZnS) constituting the light-emitting layer containing ZnS as a first primary component and, as second components, a first additional element constituting an acceptor level (Gd) and a second additional element constituting a donor level (F₃) in a semiconductor (Column 5, line 20) partly including or not including a group II-IV compound semiconductor in order to produce emission in the UV range. (Column 1, line 34).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the fluorophor of Noma into the EL fiber of Duggal, in order to produce emission in the UV range.

Regarding Claim 11, Duggal, fails to exemplify the fluorophor of the EL fiber wherein the semiconductor of the second component contains at least one type of MgS, CaS, SrS, BeS, and BaS.

Noma teaches, in Column 4, line 45, the combination of ZnS and MgS in order to be able to control the band gap energy of the host material (Column 5, lines 29-31).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the MgS into the ZnS fluorophor, as taught by Noma, in the EL fiber of Duggal, in order to be able to control the band gap energy of the host material.

Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duggal in view of Noma and further in view of Andriessen.

Regarding Claim 9, Duggal as modified by Noma, fails to exemplify the EL fiber wherein the first additional element is at least one type of Cu, Ag, Au, Li, Na, N, As, P, and Sb, and the second additional element is at least one type of Cl, Al, I, F, and Br.

Andriessen teaches, in Paragraph [0009], lines 1-5, a fluorophor (ZnS) wherein the first additional element is at least one type of Cu (line 2) , Ag, Au, Li, Na, N, As, P, and Sb, and the second additional element is at least one type of Cl (line 3), Al, I, F, and Br because the Copper is a positive ion (acceptor) and the Chlorine is a negative ion (donor)..

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the first and second elements as taught by Andriessen into the fluorophor of Noma in the EL fiber of Duggal , because the Copper is a positive ion (acceptor) and the Chlorine is a negative ion (donor).

Regarding Claim 10, Duggal, as modified by Noma, fails to exemplify the fluorophor of the EL fiber wherein the first additional element is Ag.

Andriessen teaches ,in Paragraph [0054], lines 6-8, doping ZnS (fluorophor) with Ag.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the Ag doping of ZnS, as taught by Andriessen into the EL fiber of Duggal, as modified by Noma, because Ag is a positive ion (acceptor).

Conclusion

Examiner's note: Examiner has cited particular columns and line numbers in the references as applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner.

Examiner's Note: The following references contain information that is pertinent to the claims of the instant application, but were not used in the examination process:

Morikawa et al (US PG Pub. No. 2002/0006865), Feldman et al (US Patent No. 5,876,863) and Duggal (US PG Pub. No. 2003/0099858).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DONALD L. RALEIGH whose telephone number is (571)270-3407. The examiner can normally be reached on Monday-Friday 7:30AM to 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on 571-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Peter J Macchiarolo/
Examiner, Art Unit 2879

/Donald L Raleigh/
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